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Video recording device

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Video recording device

The invention refers to a video recording device,
especially to a disk recording device like hard disk
5 recorder or optical disk recorder.

An inventive method for programming a timer, especially
for such video recording device, comprises the steps of
receiving an input start time and calculating an end time
10 from said input start time and a predetermined duration
as starting values. Depending on further input command,
times or other timer parameters are changed or confirmed.
This has the advantage that the user does not need to
enter an end time but a most likely suitable end time is
15 proposed by the timer. The predetermined duration is
selected such that it usually covers the program to be
recorded. The further input command may be a confirmation
of the proposal or a navigation command for entering
other parameters or changing time parameters. If no
20 command is received after a certain predetermined time is
elapsed, this is taken as a confirmation of the timer
programming.

Preferably, a further input command is detected to belong
25 to a second or a third type of commands. A second type
command is a command that indicates that the user wants
to set the end time manually or at least does not wish
the current end time to be changed automatically. In case
such second type command is received, no more calculation
30 of the end time is performed. A third type command is a
command that indicates that a new calculation of the end
time is to be performed. For example, if the input time
was changed, a new calculation of end time is performed.
These features have the advantage, that the end time is
35 automatically updated where necessary, but that no
automatic update occurs in situations where the user most
likely will not agree to modifications.

According to the invention, the predetermined duration is changed dependent on whether the user selects a "single event" timer or a "repeated event" timer. This has the advantage to provide the user with an acceptable end time

5   in even more cases, as usually a "single event" timer refers to recording of longer duration, as a movie, while a "repeated event" timer usually refers to several short recordings like soap opera, drama, variety show and the like.

10

Preferably, the invention provides for setting the predetermined duration, e.g. during a set-up run, to a value most suitable for the user. A country dependent setting requires the user to enter the country where the

15 device is used in and selects the predetermined duration according to a table of countries. This has the advantage that the predetermined duration is set to 60 minutes for countries where sitcoms usually take up to 60 minutes, and to other durations in countries having a different

20 time scheme. Also preferably used is a channel dependent setting. This has the advantage to adapt the predetermined duration to the special time scheme of special channels, like a news channel having a 15 minutes time scheme or a movie channel having a 90 minutes time

25 scheme. The channel dependent predetermined duration may also be dependent, in addition, to the day time or to the day of the week. Some channels have an hourly time scheme in the morning and the afternoon while a different time scheme is used in late afternoon and evening. For example

30 a 45 minutes block followed by a 60 minutes block followed by two 30 minutes blocks followed by a 90 minute block may occur. Preferably, other channels change the time scheme between working days and weekend days. In case that the user prefers a different, unique time

35 scheme, a user selected predetermined duration is provided for.

Preferably, the end time calculation is performed only if there is no other end time indication available. Such end time indication may be derived from an electronic program guide or a video programming system like VPS. Here, too,
5 the user can set his preference regarding program guide derived end time or calculated end time.

The time of an electronic device preferably comprises input means for receiving a start time and further
10 inputs, and means for computing an end time based on the start time, a predetermined duration and start time entering conditions. Start time entering conditions may be the selection of predetermined durations made in a set-up as described above or single event/multiple event
15 timing conditions and the like. A video recorder equipped with such timer provides the user a very comfortable timer programming with a very low number of figures to key in.

20 Further advantages can be taken from the description of preferred embodiments. Of course, different combinations of features than those described are also in the scope of the invention. The figures show:

25 Fig. 1   schematics of an inventive device,
Fig. 2   inventive timer programming method,
Fig. 3   detail of the timer programming method,
Fig. 4   set-up recording timer programming,
Fig. 5a-5x   different displays during timer
30   programming.

Fig. 1 shows a schematic view of an inventive video recording device 1. A recording and playback section REC outputs a playback signal to a display 2. The display 2
35 is also provided for displaying a timer menu as provided by a microprocessor uP. The microprocessor uP receives commands from a user interface UI and transfers start time ST and end time ET to a memory M1. In dependency on

the times ST, ET set in memory M1 the recording and playback section REC starts and ends recording if timer mode is selected. The microprocessor is also connected to a predetermined duration memory PDM for receiving a
5   predetermined duration PD and for calculating an end time ETC therefrom and from an input start time STI. A disk as recording medium 8 is shown inserted into recording and playback section REC. It may be a removable disk as DVD or a hard disk. The device 1 is also provided with a
10   further memory 9. The device 1 has also a link 3 through which an external removable media device 4 for removable media 5 is connectable to and disconnectable from the device 1.

15   Fig. 2 shows an example of an inventive timer programming method. After the start in step S0 a standard predetermined duration PD is set in a predetermined duration memory PDM in step S1. In step S2 an input start time STI is received. In step S3 a calculated end time
20   ETC is computed as ETC=STI+PD. In step S4 it is checked whether an end type command CMD1 is received. In this case the calculated end time ETC is taken as end time ET in step S41 and the timer programming is ended. Otherwise, it is checked in step S5 whether a second type
25   command CMD2 is received. If such command is received, in step S51 the timer programming is continued without further calculating an end time ETC. When the timer program is finished after step S51, the end time ET is taken as an input end time ETI or, if such is not
30   present, the last calculated end time ETC is taken. If the condition of step S5 is not fulfilled, it is checked in step S6 whether a third type command CMD3 is received. If this is the case, the predetermined time PD is updated in step S61 in accordance with the command CMD3 and
35   entered in step S62 in the predetermined duration memory PDM. If the result of step S6 is negative, i.e. if no command or a command irrelevant for the selection is received, it is returned to step S4. Preferably, a

function to leave the routine after a certain time without command is implemented but not shown here.

5 Fig. 3 shows a detail of the timer programming method regarding the updating step S61. In step S611 it is checked whether the third type command indicates a single event recording. If this is the case, the predetermined duration memory PDM is updated with a first predetermined duration value PD1 in step S612. If in step S611 a
10 repeated event recording is detected, the predetermined duration memory PDM is updated in step S613 with a different duration, the second predetermined duration PD2.

15 Fig. 4 shows a set-up procedure regarding timer programming. After set-up is started in step S91 the user's request is detected. In step S92 it is checked whether standard conditions are requested. In this case the first predetermined duration PD1 is set to 120
20 minutes and the second predetermined duration PD2 is set to 60 minutes in step S921. If in step S93 it is detected that country dependent determination is selected, the country information is determined in step S931. This might be by direct user input or by checking an already
25 existing country information. Following, in step S932 first and second predetermined duration PD1, PD2 are set to country dependent values PD1CC, PD2CC. Preferably, a table indicating appropriate values for each country CC is available. In step S94 it is checked whether channel
30 dependent determination is selected. In this case predetermined durations PD1 and PD2 are set to channel dependent values PD1CH, PD2CH in step S941. The latter are preferably taken from a respective table. In step S95 it is checked whether the user wants to determine the
35 durations himself and the predetermined durations PD1, PD2 are received in step S951 from the user. In step S96 the predetermined durations PD1, PD2 are stored to the predetermined duration memory PDM.

Figures 5a to 5e show different displays during timer
programming. The selected channel is indicated by CH,
start time and end time are displayed as STD and ETD, the
5   day of the timer programming is indicated by D0 to D7,
wherein D0 is today, D1 is the following day, D2 the
second following day and so on. A weekly repeat is
indicated by WR. A confirmation command is indicated by
an ok button OK. For countries where the am/pm time
10   standard is used, such indications are given. A timer
recording that shall be repeated from the next day until
the 4th next day, the day indicators D1, D2, D3 D4 are to
be selected by the user.

15   It is now described to increase the stop time
automatically to be some fixed duration later than the
start time when setting up a timer.
Usually it occurs the problem that when the user is
setting up a new timer or is modifying an existing timer
20   in Timer Setup Screen, all possible entries CH, STD, ETD
must be entered, otherwise an error message will appear.
According to the described embodiment by default the stop
time ETD is set to one hour later than the start time STD
with the input start time STI being the start time. If no
25   start time STI is input, the current time is taken as
start time STI. With this new proposal, the user is
provided with a more convenient way to setup a timer with
the duration PD the same as the fixed one by entering the
start time only, such as 1 hour. It works this way:
30   when user has entered the start time completely, i.e. all
four digits of STD the end time ETD is updated
automatically by advancing it one hour from the start
time, since most of the time the user would setup timers
with one hour duration. So user need not to enter an end
35   time ETI if that is the record duration he wants. He can
also change the end time ETD by entering another four
digits.

The duration is pre-set in the system, of course it will
be set to values other than the one hour if it is more
desirable, e.g. based on some program duration
statistics. The regular programs as drama or variety show
5 are commonly one hour or half an hour long at least in US
and Singapore.

When a new timer is set up, the Timer Setup Screen, as
shown in Fig. 5b, is perforated with default values. The
10 current channel, here channel 01 is used, the Current
System Time, e.g. 13:56, is used for the default Start
Time STD, and Current Time plus one hour as the default
Stop Time ETD, here 14:56. And with the method according
to the invention the device provides some additional
15 functions, which bring some convenience while setting up
new timers. It is about to set the End Time ETC a pre-
fixed amount of time the predetermined duration PD later
than the actual Start Time STD automatically after the
user completes the four digits entry of Start Time STI,
20 so that the user needs not set the End Time ET if the
automatically set End Time ETC suits his needs. Of course
it is still possible to set a preferred end time, ET,
thus overriding the calculated end time. Dependent on the
timer frequency, the pre-fixed amount of time PD is 120
25 minutes for ONCE timers, as this event is most likely to
be a movie, and 60 minutes for timers with other
frequencies, as this duration is suitable for sitcoms,
variety shows and the like. In order not to be too smart,
this is only applicable to the new timers, not to the
30 modified timers. Further, normally the End Time is set
automatically only once. That means as long as the user
does not navigate from STD to other buttons, but only
highlights on Start Time Button STD and enters complete
Start Time STI repeatedly or toggles the am/pm
35 repeatedly, if available, the End Time ETD would update
automatically according to the Start Time STD and the
Frequency.

Here are some examples for the application of the inventive method. Fig. 5c-e show a first example: By default, the Frequency is ONCE, i.e. single event recording. Hence when the user opens up a new timer, the
5 default End Time ETD would be PD=120 minutes later than the Start Time STD. Here, the current time is 08:20, thus STD=08:20 and ETD=10:20. The channel is channel 01. Now the user moves down to the Day Button, and changes the Frequency from D0 (single day) to D0-D5 i.e. Mon-Fri
10 if the current day is Monday, see Fig. 5d. No change on Start time STD or Stop time ETD is done at this stage. Now the user enters 10:00 as Start Time, and the Stop Time updates to 11:00 automatically, as PD2=60 minutes is used for repeated event, see Fig. 5e. Without leaving the
15 Start Time Button, the user now toggles am to pm, the Stop Time updates to 11:00 pm also (not shown), as the start time field has not been left. Further, without leaving the Start Time Button, the user changes the Start Time to 02:00am, and the stop time automatically updates
20 to 03:00am.

If now the user navigates away from the Start Time Button, maybe to change the frequency and comes back to set the Start Time STD, or goes to the Stop Time ETD and
25 changes the Stop Time ETD and comes back to set the Start Time STD. Under both conditions, the end time ETD is not updated automatically again as the described navigation commands belong to a second type of commands that indicates that no further automatic update is desired.
30 But user can enter their preferred ones.

Fig. 5c-f show a second example: By default, the Frequency is ONCE, i.e. single event recording. Hence when the user opens up a new timer, the default End Time
35 ETD would be PD=120 minutes later than the Start Time STD. Here, the current time is 08:20, thus STD=08:20 and ETD=10:20. The channel is channel 01. Now the user moves down to the Day Button, and changes the Frequency from D0

(single day) to D0-D5 i.e. Mon-Fri, see Fig. 5d. No change on Start time STD or Stop time ETD is done at this stage. Now the user enters 10:00 as Start Time; and the Stop Time updates to 11:00 automatically, as PD2=60

5   minutes is used for repeated event, see Fig. 5e. Now the user navigates away from the Start Time Button, and if he comes back to the Start Time Button again, the End Time does not update automatically but stays as in Fig. 5e, as the navigation command is taken as an indication that no

10 further update is desired.

Fig. 6 shows in diagrammatic form the content of a removable medium 5. A first memory area contains the volume identification VID, a second memory area contains

15 the file structure 6 and a third memory area is the data area 7 where several files 71 are stored.

Fig. 7 shows a menu 10 for a recording medium 8 which menu is displayed on display 2. Certain menu areas 21,

20 22, 23, 24 are provided to show an indication of different scenes SC1, SC2, SC3, SC4. In the figure one scene SC4 has been highlighted by double rim to indicate that this is the scene the user has navigated to.

25

The inventive video recording device is also provided with a function for checking the change of removable media.

5

Problem: PVR and DVD recording devices are often provided with a USB link 3 for connecting an external removable media device 4 (e.g. still picture camera equipped with flash media card). When the external removable media

10   device 4 is connected to the PVR/DVD recorder 1, the file structure 6 of the removable medium 5 is loaded. However, if the removable medium 5 at the removable media device 4 is exchanged, the PVR/DVD recorder 1 does not recognize this change. From PCs there is known to use a "refresh"

15   function, which is to be initiated by the user. Another solution to keep the file structure 6 in synchronism with the actually loaded removable medium 5 is to poll the file structure 6 periodically. An improved solution is desired.
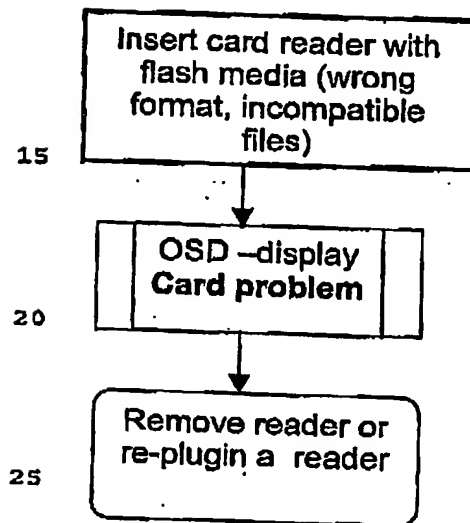
20

Solution: The inventive device 1 checks for the volume identification VID of the removable media unit 4 every time a key is pressed at the PVR/DVD recording device 1, or a corresponding remote control or control unit.

25   Preferably, this is done only when a key is pressed that causes an action on the removable media unit 4.
This has the advantage that processor time is saved in comparison to polling periodically. A dedicated "refresh" procedure is saved and, nevertheless, the correct file

30   structure 6 is available whenever necessary, as each pressing of a key indicates a possible need of the correct file structure 6. The idea can advantageously be implemented for downloading JPEG or MP3 files from the data area 7 to the PVR/DVD recording device 1.

Fig. 6 shows in diagrammatic form the content of a
removable medium 5. A first memory area contains the
volume identification VID, a second memory area contains
the file structure 6 and a third memory area is the data
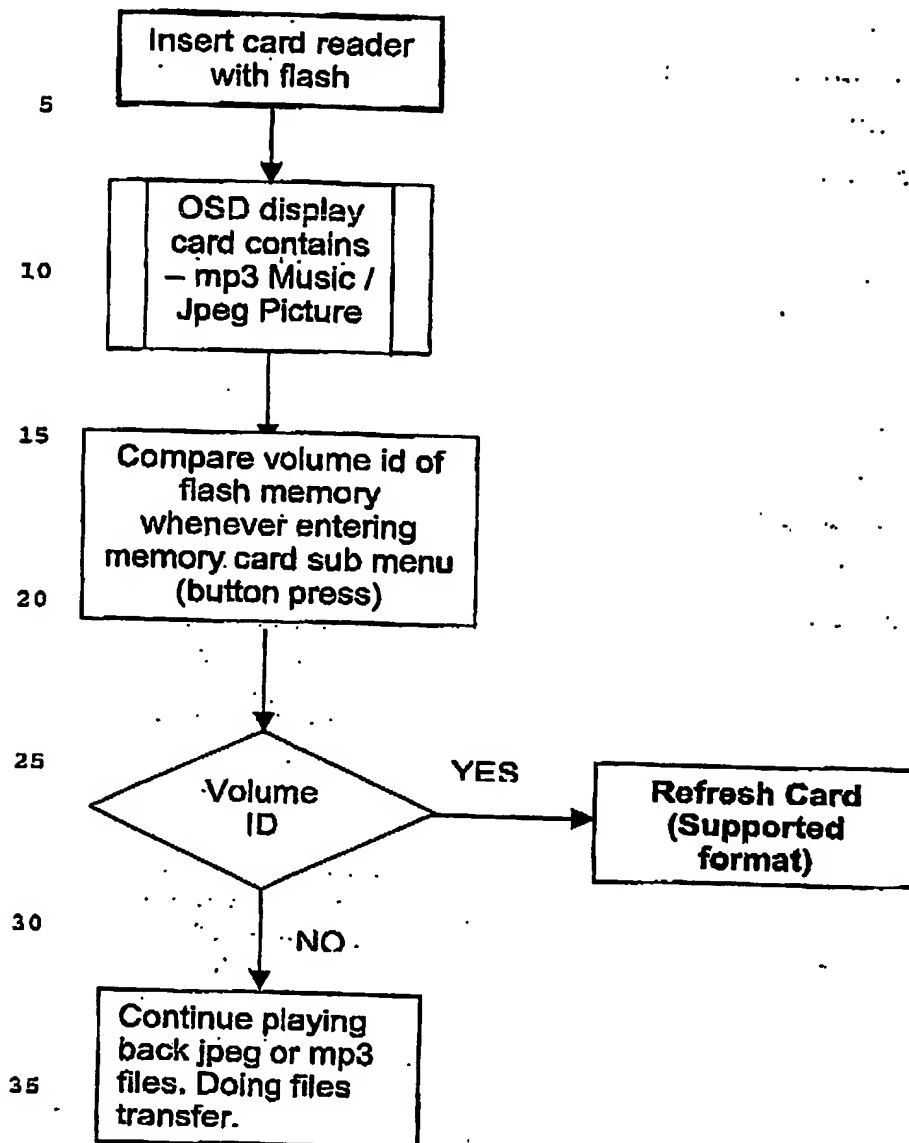area 7 where several files 71 are stored.

The following shows the situation where a removable media unit 4, a card reader, is present as well as a flash card 5. However, the removable medium 5, here the flash card, comprises a wrong format or incompatible files. The
5 existence of a problem with the card 5 is displayed on the display 2 as On Screen Display OSD. The user is expected to remove the card reader 4 or to re-plugin the card reader 4.

10

```
        ┌─────────────────────────┐
        │ Insert card reader with │
        │ flash media (wrong      │
        │ format, incompatible    │
15      │ files)                  │
        └─────────────────────────┘
                    │
                    ▼
        ┌─┬───────────────────┬─┐
        │ │ OSD –display      │ │
        │ │ Card problem      │ │
20      └─┴───────────────────┴─┘
                    │
                    ▼
        ╭─────────────────────────╮
        │ Remove reader or        │
        │ re-plugin a  reader     │
25      ╰─────────────────────────╯
```

The OSD display 2 indicates a card problem, e.g. when it
30 encounters a flash memory card 5 with format that is not supported by the device's file system or if the flash memory card 5 does not contain the files 71 or file types required by the device 1.

35 The following flow chart shows the situation where a removable media unit 4, a card reader, is present and also a removable medium 5, a flash card, is present.

```
        ┌──────────────────────┐
        │   Insert card reader │
        │      with flash      │
   5    └──────────┬───────────┘
                   │
                   ▼
        ┌──┬───────────────┬──┐
        │  │  OSD display  │  │
        │  │ card contains │  │
   10   │  │ – mp3 Music / │  │
        │  │  Jpeg Picture │  │
        └──┴───────┬───────┴──┘
                   │
   15   ┌──────────▼───────────┐
        │ Compare volume id of │
        │     flash memory     │
        │  whenever entering   │
        │ memory card sub menu │
   20   │    (button press)    │
        └──────────┬───────────┘
                   │
                   ▼
   25          ◇ Volume ◇      YES     ┌──────────────────┐
             ◇    ID    ◇ ──────────▶  │   Refresh Card   │
               ◇      ◇               │   (Supported     │
                 ◇  ◇                  │     format)      │
   30              │  NO               └──────────────────┘
                   ▼
        ┌──────────────────────┐
        │  Continue playing    │
        │  back jpeg or mp3    │
   35   │  files. Doing files  │
        │  transfer.           │
        └──────────────────────┘
```

The OSD display 2 indicates that required files 71 are
40 available. Whenever the user moves to a sub menu that is
    related to the removable medium 5, a check for the volume
    identification VID is performed. This ensures that a very
    low number of such check processes is performed. An
    alternative solution is to perform such check every time
45 the user performs an action like navigating, entering
    data or commands or the like when being in a sub menu

that is related to the removable medium. This has the
advantage that check processes are performed whenever
they seem to be likely, thus giving up-to-date
information to the user while not blocking too much
5   processing capacity.

In case that the volume identification VID has not
changed, processing is continued, e.g. playback command
or transfer command is accepted and performed and
10 respective active processes are being continued.

In case that the volume identification VID has changed, a
refresh process is performed. The user is informed about
the new status, e.g. by means of the OSD 2. For a
15 removable medium 5 that is newly inserted, the following
is performed: check volume identification VID of each
flash memory 5 inserted, if volume identification VID is
NULL generate a random 4 byte identification code.
Preferably, the random generation function is taken from
20 screen saver's random coordination function and write it
to the particular flash memory as volume identification
VID.

The inventive device 1 has the advantage, that flash
25 memory 5 can be safely removed or exchanged during idle
mode; i.e. in a mode where the host, the inventive device
1, is not accessing the card reader 4, hence no command
is send. When update of file structure 6 might be
necessary, a checking process is performed. The result of
30 the checking process is either; that the OSD 2 displays a
warning that no card is inserted, or that a refresh for
the flash memory is performed if a volume identification
VID was detected.

In any of time while card 5 is playing/ copying files 71 like jpeg or mp3, it will be unsafe to remove the flash memory 5. This will prompt "Improper Card Removal" display on OSD 1, to reactivate the reader 4 in this

5 situation a re-plugin of the reader 4 to the link 3 is performed.

In case the removable medium does not provide the possibility to have a volume identification VID another

10 possibility apart from the volume identification VID to identify presence of a different volume is to check for other characteristics that are quickly accessible and that provide high likelihood of correct identification.

15 The volume identification VID of the flash memory is checked every time the user is entering a USB sub-pic menu. This check is only done when the user presses a button on the remote control or an internal control till the selection of files 71 to play. The device, via

20 microprocessor μP checks the volume identification VID at every stage till opening a file 71 for mp3/jpeg decoding.

The removable media device 4 may be of the multicard
reader type. In this case, the removable media device 4
is provided with means to receive several removable media
5, 5', 5'' as indicated by dashed lines in Fig. 1. The
5 removable media 5, 5', 5'' may be of the same type as
well as of different type. Usually, only the content for
a single one of the media 5, 5', 5'' can be displayed on
display 2. Displaying several tables of content for
several media 5, 5', 5'' would reduce the size of the
10 characters to be used or would increase the complexity,
which both is not acceptable for a consumer electronic
device where the display 2 screen is arranged
comparatively remote from the user.

15 One approach is to detect the first readable Logical Unit
(LUN for accessing designated card 5 slot) and display
its content. Hence the user can only access this card 5
slot. If the user decides to change to another card 5',
5'' slot, he/she has to remove the card reader 4 from the
20 player and to re-plugin again. This case will be
troblesome if users are swapping cards 5, 5' 5'' very
often or if they are using more than one card 5, 5', 5''.

According to the invention, if a multicard reader is
25 inserted, the following steps are performed:
•Read each card 5, 5', 5'' slot to determine whether
media 5, 5', 5'' (e.g. flash memory) is inserted to a
certain slot or not.
•Read each media's 5, 5', 5'' file system and generate a
30 combined Table of Content(TOC) of file names for all
media present.
•OSD display 2 will display the content of media 5, 5',
5'' as a whole volume.

35 With this solution it is solved the UI display problem of
displaying all media 5, 5', 5'' on screen as individual

volume (just like PC) and it is saved all the trouble for the users as to refresh card 5, 5', 5'' whenever they want to read difference card 5, 5', 5'' slot.

5　Fig. 8 shows a block diagram with additional information.

Problem: Today user will need to unplug the USB card reader 4 from the machine 1 and plug it back to the machine again to do a card 5, 5', 5'' reading(refresh
10　card) if he had changed one of the cards 5, 5', 5'' on the reader.

According to the invention, when the user presses ok now at the Memory Card Button(User Interface OSD) the
15　removable media unit 4 or the device 1 will proceed to do a card reading again(refresh card) to check if a new card is being placed into the reader.

Advantages: User now will not need to first disconnect
20　the reader from the machine and reconnect the reader back to the machine to do a card refresh. This will also greatly reduce possible wear and tear cause to the USB connector on the machine as user will not need to plug/unplug the reader everytime he changes the card.
25　This is also useful for a reader 4 that has mutiple slots, user will now be able to do a card refresh whenever he changes a card without need to plug/unplug the reader.

30　That means that the device 1 or the unit 4 will not only do a refresh when a same type of memory card is inserted with difference volume id, but also when the user requests to refresh the card.

This solution is a more interactive one between user and the system as the user can refresh the card at the main menu with 'OK' button pressed.

5

Claims

1) Method for programming a timer having the steps of
   - receiving an input start time (STI),
   - calculating an end time (ETC) by taking into account said input time (STI) and a predetermined duration (PD) as starting values,
   - receiving a further input command (CMD1, CMD2, CMD3)
   - taking said calculated end time (ETC) as end time (ET) if said further input command (CMD1, CMD2, CMD3) is an end type command.

2) Method according to claim 1 comprising at least one of the steps
   - no more performing calculation of end time (ETC) if said further input command (CMD2) belongs to a second type command (CMD2).
   - returning to the calculating step using starting values (STI, PD1, PD2) updated in accordance with said further input command (CMD2) if said further input command (CMD3) belongs to a third type command (CMD3).

3) Timer of an electronic device (1) comprising
   - time input means (UI) for receiving a start time (STI)
   - means (uP) for computing an end time (ETC) based on the start time (STI), start time entering conditions (CMD1, CMD2, CMD3) and a predetermined duration (PD).

4) Method according to claim 1 or 2 or timer according to claim 3, wherein said predetermined duration (PD) is a first duration (PD1) in case an input command "single event recording" is set, and a second duration (PD2) in case an input command "repeated event recording" is set.

5)   Method or timer according to claim 4, wherein said first and second duration (PD1, PD2) are one of country dependent predetermined duration (PD1CC, PD2CC), and channel dependent predetermined duration (PD1CH, PD2CH), and user selected predetermined duration, and day time or week day dependent predetermined duration.

5

10   6)   Video recorder with a timer according to one of claims 1, 4 or 5 or being provided for performing the method according to one of claims 2 to 5.
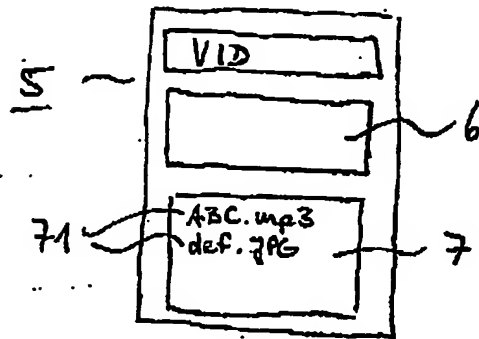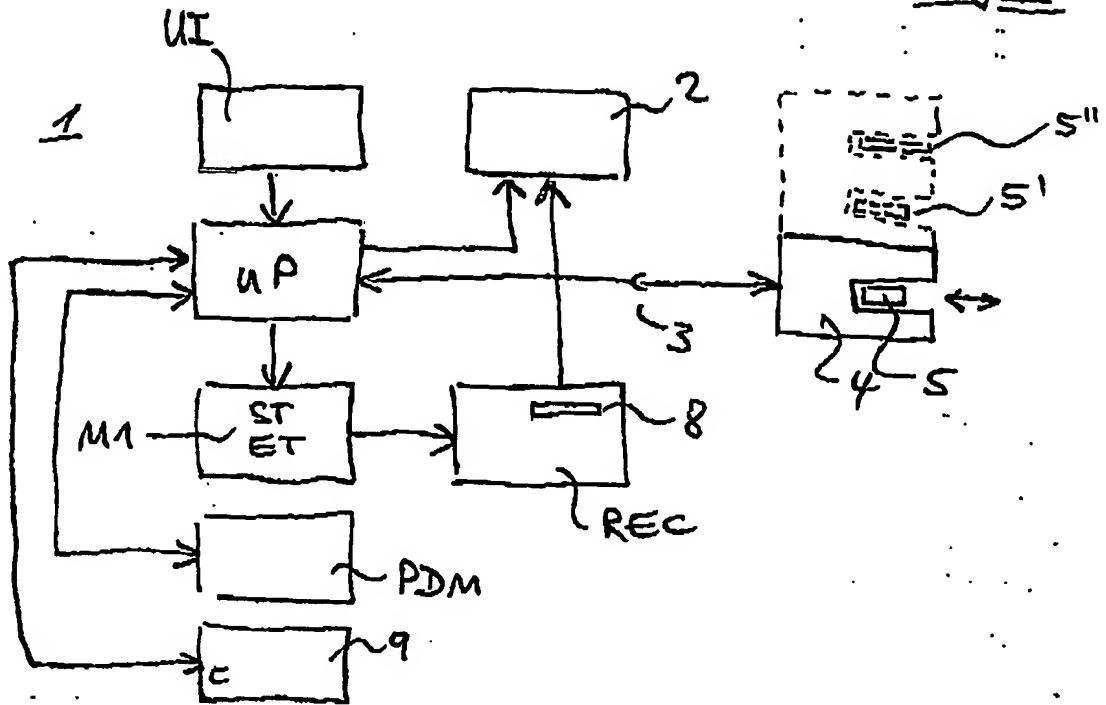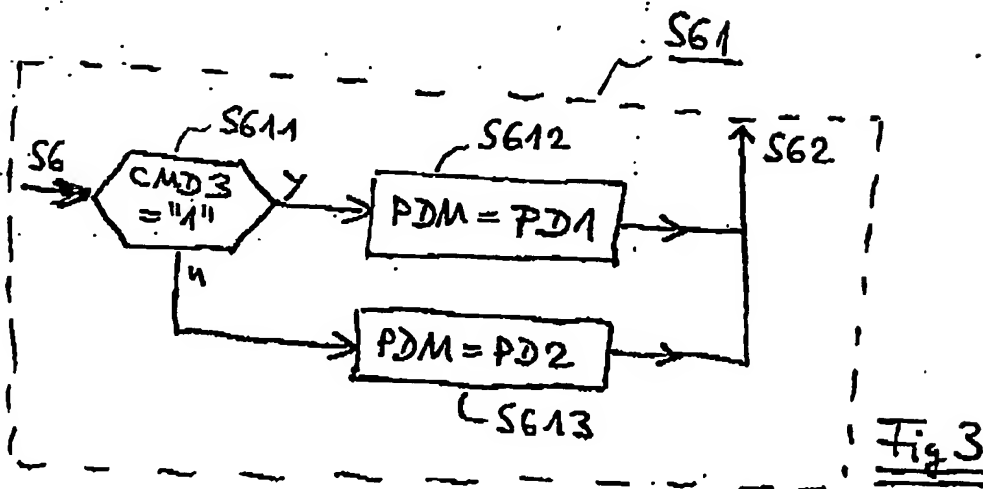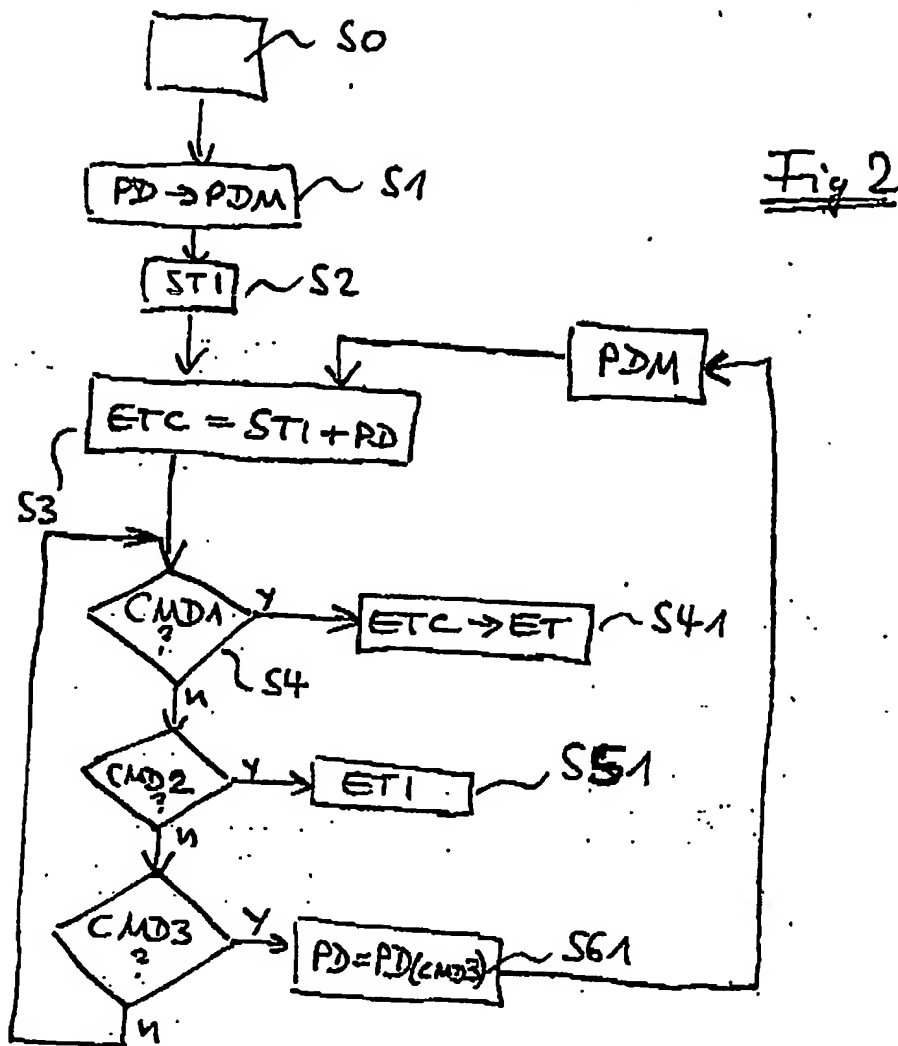
Fig 1

UI

1

2

5"

5'

uP

3

4   5

M1   ST
      ET

8

PDM

REC

9   C

VID

5

6

71   ABC.mp3
      def.jpg

7

Fig 6

Fig 2

S0

PD → PDM   S1

STI   S2

ETC = STI + PD

PDM

S3

CMD1 ?   Y   ETC → ET   S41

S4

N

CMD2 ?   Y   ETI   S51

N

CMD3 ?   Y   PD = PD(CMD3)   S61

N

S61

S6   CMD3 = "1"   Y   PDM = PD1   S62

S611   S612

N

PDM = PD2

S613

Fig 3

SE1 21 22 SE2

10

SE3 23 24 SE4

Fig 7

SETUP ~ S91

S92

~ S921
PD1 = 120 min
PD2 = 60 min

S93 S931 ~ S932
CC PD1 = PD1CC
PD2 = PD2CC

S94 ~ S941
PD1 = PD1CH
PD2 = PD2CH

S95 ~ S951 S96
PD1, PD2 END
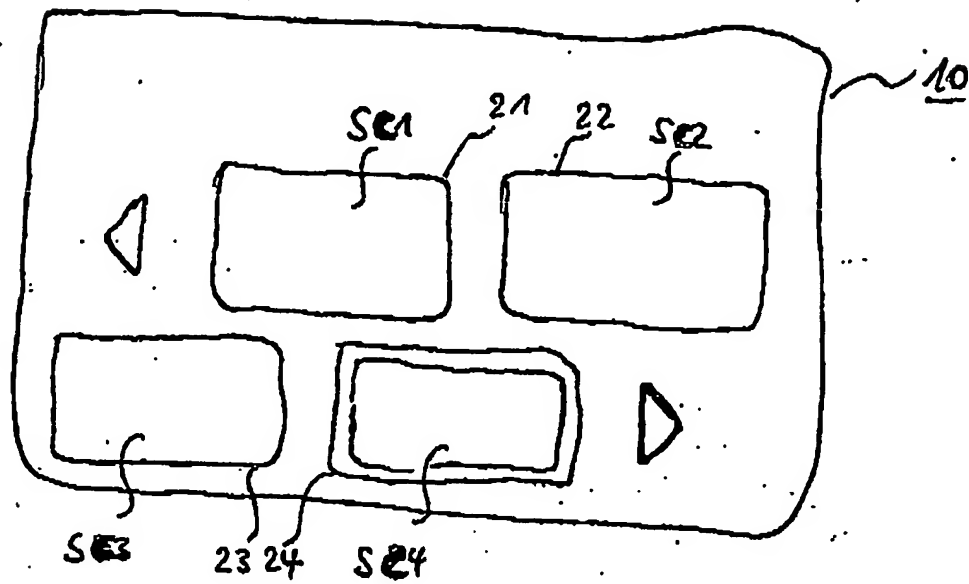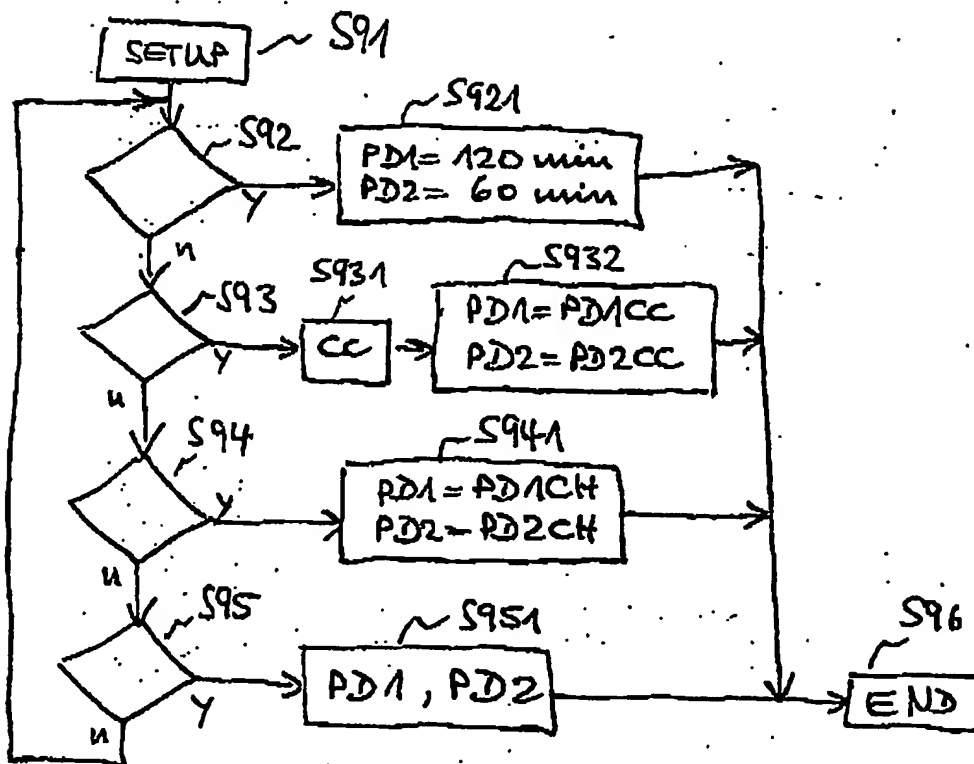
Fig 4

Fig. 5a

```
CH:    —
STD:  —:—   am/pm        EDT:  —:—   am/pm
Day:  D0    D1    D2    D3    D4    D5    D6    D7
       WR
OK
```

Fig. 5b

```
CH:    01
STD:  13:56              EDT:  14:56
Day:  D0    D1    D2    D3    D4    D5    D6    D7
       WR
OK
```

Fig. 5c

```
CH:    01
STD:  08:20 am/pm        EDT:  10:20 am/pm
Day:  D0    D1    D2    D3    D4    D5    D6    D7
       WR
OK
```

Fig. 5d

```
CH:    —
STD:  08:20 am/pm        EDT:  10:20 am/pm
Day:  D0    D1    D2    D3    D4    D5    D6    D7
       WR
OK
```

Fig. 5e

```
CH:    —
STD:  10:00 am/pm        EDT:  11:00 am/pm
Day:  D0    D1    D2    D3    D4    D5    D6    D7
       WR
OK
```

UI Display

LUN0 Filename 1
LUN0 Filename 2
. . . . . .
LUN0 Filename n
LUN1 Filename 1:
LUN1Filename 2
. . . .
LUN1 Filename n
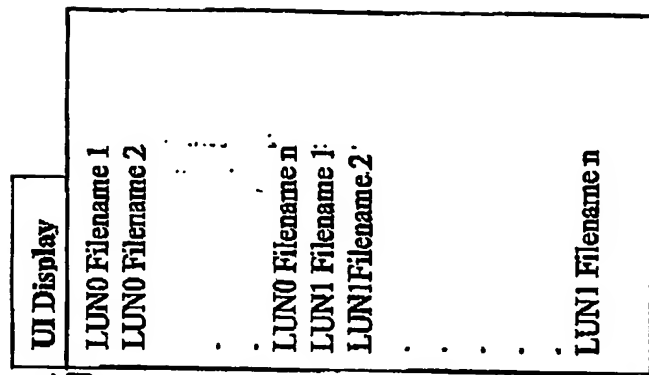
Combined table of content for all media 5, 5''

(It is assumed that, in this case, media 5' and 5''' are not present in removable media device 4)

LUN0 Filename 1
LUN0 Filename 2
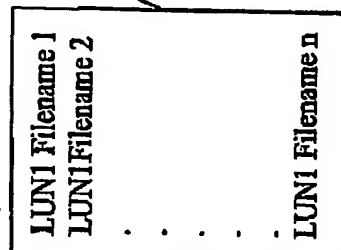. . . . . .
LUN0 Filename n

table of content of medium 5

LUN1 Filename 1
LUN1Filename 2
. . . . . .
LUN1 Filename n

table of content of medium 5''

MMC & SD (LUN0)   5

SmartMedia (LUN1)   5'

CompactFlash (LUN2)   5'''

Memory Stick (LUN3)   5''

multiple card reader 4

Fig. 8